REMARKS

In view of the above amendments and the following remarks, reconsideration and further examination are respectfully requested.

I. Amendments to the Claims

New claim 19 has been added to depend from claim 2. Support for claim 19 can be found, at least, on pages 22 and 23 of the originally filed specification, specifically equation 33 described therein.

II. 35 U.S.C. § 103(a) Rejection

Claims 1, 5, 9 and 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Krishnamurthy (U.S. 6,256,038), Bronskill (U.S. 6,201,549), and Moreton (U.S. 5,636,338). This rejection is believed clearly inapplicable to independent claims 1, 5, 9 and 10 and the claims that depend therefrom for the following reasons.

Independent claim 1 recites a computer aided design (CAD) system including a first fundamental form computing device for computing coefficients of a first fundamental form at a mesh point of a mesh, the coefficients of the first fundamental form being defined at the mesh point by first-order differential values of the mesh point, and including a second fundamental form computing device for computing coefficients of a second fundamental form at the mesh point, the coefficients of the second fundamental form being defined at the mesh point by a product of second-order differential values of the mesh point and a normal vector of the mesh at the mesh point.

Accordingly, because claim 1 recites that the coefficients of the first fundamental form are defined at the mesh point by first-order differential values of the mesh point, it is clear that the coefficients of the first fundamental form are defined in the field of surface geometry in a three-dimensional space, which eliminates any need to correct for a difference between two-dimensional geometry and three-dimensional geometry.

Regarding the difference between two-dimensional geometry and three-dimensional geometry, the Applicants note that when two-dimensional geometry and three-dimensional geometry are combined, a means for correcting the difference between the two-dimensional geometry and the three-dimensional geometry is necessary. In other words, the concept of place (two-dimensional) geometry is not readily applicable to the reproduction of the curved surface (three-dimensional geometry) without an approximation error, such that, if the concept of place geometry is applied to the reproduction of the curved surface according to claim 1, an error due to the difference between geometric concepts will occur. Therefore, as mentioned above, an additional means for correcting this error, which is not disclosed or suggest in the referenced prior art, would be required to achieve the invention of claim 1.

Each of the cited references and the combination thereof are discussed below in detail.

Bronskill Reference. The above-described 35 U.S.C. § 103(a) rejection relies on Bronskill for teaching first-order differential values of the mesh point, as recited in claim 1 (see item 4 on page 2 of the Office Action).

The Applicants note that Bronskill does in fact disclose the use of two-dimensional curves (e.g., plane geometry) and first order differential values (see items 4 and 10 on pages 2 and 3 of the Office Action; and col. 6, lines 10-24).

Krishnamurthy Reference. The above-described 35 U.S.C. § 103(a) rejection appears to rely on Krishnamurthy (see col. 6, lines 10-15) for teaching computing coefficients in a three-dimensional space, as required by claim 1 (see item 4 on page 2 of the Office Action).

Krishnamurthy teaches that an input surface is scanned 3-dimensional data, wherein the input is a dense, unparameterized polygonal mesh (see col. 6, lines 10-15).

Moreton Reference. The above-mentioned 35 U.S.C. § 103(a) rejection also relies on Moreton (see col. 4, lines 24-32) for teaching computing coefficients in a three-dimensional space, as required by claim 1 (see item 4 on page 2 of the Office Action).

The invention of Moreton is based on the concept of surface geometry, which includes computing coefficients in a three-dimensional space (see col. 4, lines 24-32; col. 12, lines 7-34; col. 14, lines 14-21; and col. 18, lines 5-30).

Combination of Krishnamurthy, Bronskill and Moreton References. The combination of Krishnamurthy, Bronskill and Moreton fails to disclose or suggest the above-mentioned features required by claim 1 for the following reasons.

As discussed above, because claim 1 recites that the coefficients of the first fundamental form are defined at the mesh point by first-order differential values of the mesh point, it is clear that the coefficients of the first fundamental form are defined in the field of surface geometry in a three-dimensional space, which eliminates any need to correct for a difference between two-dimensional geometry and three-dimensional geometry. Furthermore, as noted above, the concept of place geometry is not readily applicable to the reproduction of the curved surface without an approximation error, such that, if the concept of place geometry is applied to the reproduction of the curved surface according to claim 1, then an error due to the difference

between geometric concepts will occur, wherein an additional means for correcting this error, would be required to achieve the invention of claim 1.

Regarding the error due to the difference between the plane and surface geometric concepts, the Applicants note that the concept of plane geometry, as described in Bronskill cannot be combined with the concept of surface geometry, as described in Krishnamurthy and Moreton, without an additional means for correcting the error.

As a result, even though Bronskill discloses the use of plane geometry and Krishnamurthy and Moreton disclose the use of surface geometry, Bronskill, Krishnamurthy and Moreton cannot be relied upon for disclosing or suggesting utilizing the fundamental forms, such that the coefficients of the first fundamental form are defined at the mesh point by first-order differential values of the mesh point, and computing coefficients of a second fundamental form at the mesh point, the coefficients of the second fundamental form being defined at the mesh point by a product of second-order differential values of the mesh point and a normal vector of the mesh at the mesh point, as recited in claim 1.

Therefore, because of the above-mentioned distinctions it is believed clear that claim 1 and claims 2-4, 11, 12 and 19 that depend therefrom would not have been obvious or result from any combination of Krishnamurthy, Bronskill and Moreton.

Furthermore, there is no disclosure or suggestion in Krishnamurthy, Bronskill and/or Moreton or elsewhere in the prior art of record which would have caused a person of ordinary skill in the art to modify Krishnamurthy, Bronskill and/or Moreton to obtain the invention of independent claim 1. Accordingly, it is respectfully submitted that independent claim 1 and claims 2-4, 11, 12 and 19 that depend therefrom are clearly allowable over the prior art of record.

In other words, despite the fact that Bronskill teaches plane geometry and Krishnamurthy and Moreton teach surface geometry, there is no disclosure in any of Bronskill, Krishnamurthy and Moreton that would correct the error due to the differences between the plane and surface geometric concepts. As a result, the combination of Bronskill, Krishnamurthy and Moreton cannot utilize the fundamental forms such that the coefficients of the first fundamental form are defined at the mesh point by first-order differential values of the mesh point, and compute coefficients of a second fundamental form at the mesh point, the coefficients of the second fundamental form being defined at the mesh point by a product of second-order differential values of the mesh point and a normal vector of the mesh at the mesh point, as recited in claim 1.

Independent claims 5, 9 and 10 are directed to a program, a system and a program, respectively and each recite features that correspond to the above-mentioned distinguishing features of independent claim 1. Thus, for the same reasons discussed above, it is respectfully submitted that independent claims 5, 9 and 10 and claims 6-8 and 13-18 that depend therefrom are allowable over the prior art of record.

III. Conclusion

In view of the above remarks, it is submitted that the present application is now in condition for allowance and an early notification thereof is earnestly requested. The Examiner is invited to contact the undersigned by telephone to resolve any remaining issues.

Respectfully submitted,

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